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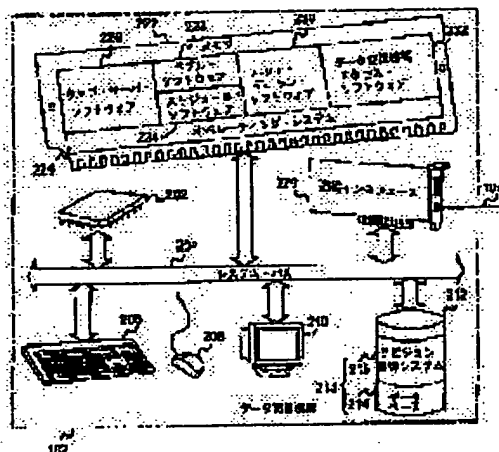
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(54) COMPUTER SYSTEM CONSTITUTION CHANGE TRACKING METHOD

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a system manager with a management/problem processing function which is not on real time basis by tracking a constitution change on a computer and a mutual connection device through the use of a revision control system and constitution information to be collected and storing the history.

SOLUTION: A browser computer requests one page in a tracking system from a remote support node 102. When execution is permitted, a CGI script accesses a data storage mechanism 218 through access software to a data base 214 or access software to a revision control system 216 or data storage mechanism access software 232 being access software to both systems. Data accessed from the data storage mechanism 218 are returned to a web server software 226 and sent to the browser computer for display in a browser frame.



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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] In addition to this, this invention relates to management and problem processing of a contact especially about computer system at the computer system row inside a network.

[0002]

[Description of the Prior Art] Management and problem processing of a computer system network are an important and fundamental task in today's business organization, government agency, and educational facilities most. Some products which give that a system administrator performs the management and problem processing of the computer on a network and a router, a bridge, a hub, a switch, etc. about interconnection equipment have been developed. Some products are designed so that it may give managing a system configuration by the real time. Such a product can tell a system administrator the composition of the specific computer at the time, or equipment. Moreover, some products carry out change to the computer or equipment of specification [a system administrator] at once, or make it possible to make it return to a front state.

[0003] Moreover, although it can tell a system administrator what the present composition of a computer or interconnection equipment is depending on a product, when the composition is the past specification, a system administrator cannot be told about what thing it was. Moreover, although composition can tell how it was and a system administrator about another product one week ago as compared with present, as compared with one-week before, it cannot notify how composition two weeks ago was. Moreover, the greater part of such a product cannot tell a system administrator about change of the composition of the between at the two times, but it only presents the computer at each time, or the whole state of interconnection equipment. In order to discriminate what change there was, a system administrator has to compare two composition.

[0004]

[Problem(s) to be Solved by the Invention] Therefore, it is clear that the need of receiving equipment at the improved method row which provides a system administrator with the management which is not based on real time and a problem processing facility exists in this industry. It discriminates quickly and efficiently what change the computer or interconnection equipment of a system configuration within the limits had in between at the two times, and the need of receiving the way a system administrator enables it to use such change easily for problem processing and management exists in this industry.

[0005]

[Means for Solving the Problem] In order to solve the above-mentioned technical problem, this invention pursues composition change of the computer system equipment on a network, In order to pursue historically composition change of the computer on a computer system network and interconnection equipment, a revision control system is used, The computer at the specific time and the composition state of interconnection equipment are saved in a revision control system, Change of the composition of a computer and interconnection equipment is discriminated so that problem processing and management of a computer system network can be given, The computer at the past specification time and the composition state of interconnection equipment are displayed, The time frame which displays the composition state of a computer and interconnection equipment is changed, It aims at displaying the collected composition state data about constituting collected composition data to a logical hierarchy, a computer, and interconnection equipment on a web browser.

[0006] The tracking system offered by this invention in order to attain the above-mentioned purpose gives the network administration of computer system, and problem processing by using a revision control system and the configuration information to collect, pursuing the composition change about a computer and interconnection equipment, and memorizing the history. The composition data of the computer for surveillance on a network and interconnection equipment are collected periodically, and are memorized by the data-storage mechanism arranged inside the independent computer called remote support node linked to a network. A data-storage mechanism consists of a database and a revision control system. Although configuration information can be displayed directly on the graphics display of a remote support node, it lets one another computer which has more typically the web browser which accesses a remote support node via a network pass, and configuration information is accessed.

[0007] Especially this method collects the configuration information and the network configurations about an operating system, a file system, printing and spooling, a boot and a shutdown, hardware, and software about the computer for surveillance. About the interconnection equipment for surveillance, this method collects especially the configuration information about the composition file which can be read and the introduced card of an interface, an IP address, the root, a static route, a TCP port, an UDP port, an SNMP variable, human being, and a machine.

[0008] The collection software arranged on a remote support node collects composition data from the client computer for

surveillance and interconnection equipment on a network. Each of the configuration item collected from a computer and interconnection equipment is specified by the data collection template included in the tracking system. Being able to use a different template about various computer types and interconnection equipment, each template defines what configuration item is collectable from the equipment of each specific type.

[0009] All the client computers currently supervised need the special resident software called client collection software so that positive collection of configuration information may be attained. already usable [in / interconnection equipment / about the interconnection equipment for surveillance] -- standard -- additional software is not needed other than SNMP, Telnet, and a TFTP mechanism. Collection software inspects the configuration item of which interconnection device type and collection were required, and determines the most suitable correspondence procedure among the above. However, the interconnection equipment for surveillance must grant an access privilege to a collection process. This access privilege grant is accompanied by usually carrying out change which makes collection possible to the interconnection equipment for surveillance.

[0010] Collection software collects configuration items (it is usually once to a day) the collection period set up before by defining initial-collection time and frequency (usually every day) in advance. Whenever collection is performed, frequency is added to the last acquisition time and a database is updated so that next collection can be started.

[0011] In each collection period, if a snapshot is created for each [about each of the computer for surveillance, or interconnection equipment] configuration item of every and it is changeable, change will be memorized by the data-storage mechanism. A configuration item is the output of the command which displays configuration information in a text file or ASCII form. A snapshot is the unit of being observed when composition data's are collected from equipment for surveillance composition data. Although the actual data collected are memorized by the revision control system, on the other hand, a database includes the information about what changed, and the information about the logical hierarchy of a system currently supervised.

[0012] A graphics display is divided into two frames when accessing the information memorized through the web browser. An informational logical hierarchy is displayed on one frame in tree form. Change observed between the snapshots taken by different collection period is displayed on another frame. The composition from which various differs can be displayed by changing the collection period chosen for comparison. The configuration item which had change between two selected collection periods is shown by the mark placed on the icon of the item in a tree. When it is in the group in the tree with which a configuration item with change was not opened, a mark spreads to up to the tree, and is displayed on the group icon. This notifies a user of the configuration item having had change in one under this group icon of level. By opening a required number of the groups or subgroups in the tree, a user can display each item which finally has a mark with change.

[0013]

[Embodiments of the Invention] The aspect considered to most often carry out this invention in this time is described below. It should not be considered that the following description is things with a restrictive meaning, but description is made only from the purpose explaining the general principle of this invention.

[0014] Drawing 1 shows the computer and interconnection network system which incorporated the tracking system of this invention. The computer system network 100 has the remote support node 102 connected to the component of others of the computer system network 100 via the network connection path 104 as shown in drawing 1. Although the computer system network 100 has interconnection equipment 106, interconnection equipment 106 is a router, a bridge, a hub, a switch, etc., and it is connected to the remote support node 102 for it via the network connection path 104 again. The number of 106 of the interconnection equipment in the computer system network 100 has more and a few thing than the number shown in drawing 1.

[0015] The computer system network 100 has the computer 108 for surveillance by which a network connection path is connected to the remote support node 102 via 104 again. The number of the computers 108 for surveillance in the computer system network 100 has more and a few thing than the number shown in drawing 1. In order to see the composition data memorized on the remote support node 102, the browser computer 110 accesses the remote support node 102 via the network connection path 104. The number of the browser computers 110 in the computer system network 100 has more and a few thing than the number shown in drawing 1. The browser computer 112 which is a candidate for surveillance is supervised by the remote support node 102 via the network connection path 104. Since the browser computer 112 for surveillance looks at the composition data memorized on the remote support node 102 again, it can access the remote support node 102 via the network connection path 104. The number of the browser computers 112 for surveillance in the computer system network 100 has more and a few thing than the number shown in drawing 1.

[0016] Drawing 2 shows the remote support node 102 of the tracking system of this invention. The remote support node 102 contains the processing element 202 as shown in drawing 2. The processing element 202 communicates with the element of others of the remote support node 102 via a system bus 204. A keyboard 206 enables a user to input information into the remote support node 102, and the graphics display 210 enables the remote support node 102 to output information to a user. It is used in order that a mouse 208 may also input information.

[0017] Storage 212 is used in order to memorize data and a program in the interior of the remote support node 102. In storage 212, a data-storage mechanism with two components called a database 214 and the revision control system 216 is included. Moreover, the communication interface 220 connected to the system bus 204 receives information from the network connection path 104. Moreover, the memory 222 connected to the system bus 204 includes an operating system 224, the web server software 226, the pebbles software 228, the hat demon software 230, the data-storage mechanism access software 232, and the schedule software 234. These software is called from storage 212.

[0018] (Drawing 1) The browser computer 110 requires 1 page (namely, HTML file) of the tracking system of this invention from the remote support node 102. A demand is dealt with by the web server software 226. The web server software 226 calls the

pebbles software 228. The pebbles software 228 consists of CGI scripts. CGI is the abbreviated name of Common Gateway Interface (common gateway interface). A CGI script passes a token to the hat demon software 230 in order to obtain execution permission. If execution permission is given, a CGI script will be accessed at a data-storage mechanism through data-storage mechanism access soft UEA which is either of the access software to the access software or both to the access software over a database 214, or the revision control system 216. The data accessed from the data-storage mechanism 218 are returned to the web server software 226, and are further sent to the browser computer 110 for the display in a browser frame. The schedule software 234 is later mentioned with reference to drawing 6.

[0019] Drawing 3 shows the hierarchy for memorizing the data of the tracking system of this invention. It is collected and the composition data memorized by the data-storage mechanism 218 are assembled by one view. This view assembles the composition data collected from the equipment for surveillance of a network system to a layered structure. Although this view corresponds to how the data in a user interface are assembled, closely, it should not be considered that it is an actual display.

[0020] If drawing 3 is referred to, there is a root node 300 in the most significant of a hierarchy. This is usually the systematic name using tracking systems, such as "XX company" or "XX company manufacture department", or a section name. Immediately under the root node 300, the group node 302 of the group which pursues a computer and interconnection equipment is constituted. The typical examples of a group are an "accounting group", a "manufacture group", and a "research-and-development group." The computer apparatus node 304 lists all the computers contained under the group node 302. The interconnection equipment node 306 lists all the interconnection equipments contained under the group node 302. The computer apparatus node 304 can also be further decomposed into the subsystem node 308. A subsystem node expresses one software groups inside a computer [like], such as an "operating system" and an "accounting system."

[0021] There is an item node 310 in the bottom of a hierarchy, and this is a leaf node showing the composition data collected individually. The item node 310 is a child node of the subsystem node 308 and the interconnection equipment node 306. moreover. The item node 310 may serve as a direct child of the computer apparatus node 304, when the subsystem node 308 does not exist. A group node, an equipment node, an additional subsystem node, and an additional item node are having the publication in a hierarchy omitted by the notation "..."

[0022] Drawing 4 is the block diagram showing screen expression of the browser computer 110 which accesses the stored data of the tracking system of this invention, or the browser computer 112 for surveillance. If drawing 4 is referred to, the screen display 400 of the browser computer 110 (drawing 1) or the browser computer 112 for surveillance will start web browser software, and URL (namely, universal resources locator Universal Resource Locator) of the tracking system of this invention will be required. (Drawing 1) The remote support node 102 returns the HTML page demanded for the display on the screen display 400. The screen display 400 is divided into two frames called the trace tree frame 402 and the data display frame 404.

[0023] In the trace tree frame 402, in order to access the functionality from which a tracking system differs, a tab 406 is chosen. By choosing a management tab, a user accesses the function manager of this invention, and since he sets up a tracking system, he gets things. The calculation code of a user and a user is added by this, it is deleted, a computer and interconnection equipment are added, it is deleted, a group is added, it is deleted, a collection schedule is added, it is deleted, collection of each item is made into ready condition, or it changes into an execution improper state. By choosing a log tab, a user can access the log function of this invention and can see collection activities, an error, and the log entry of an alarm.

[0024] A user can access the trace function of this invention by choosing a trace tab for showing in Table 4. Selection of a trace tab enables a user to access the trace tree 412 and the usable action 408. By choosing the button 410 of the usable action 408 within the limits, a user can change the method of presentation of the data memorized. For example, by choosing a different button 410, a user changes the collection period about the trace tree 412 which displays configuration information, and a display can be updated or he can access [**** / that only change of the composition state between two specific collection periods is shown / , and] a help file so that the present configuration information may be reflected. / that the composition state about a specific collection period is shown

[0025] With a button 410, since a user displays change of configuration information, he can choose a start and end period of collection. Two collection periods chosen such define the period which reports observed composition change. Change observed is the difference between two snapshots of the configuration item caught by two selected collection periods. A tracking system takes out a difference of two snapshots. The difference itself can be seen through a web browser user interface. Change like the date in a command output expected or it is not important was disregarded, and this difference analysis is equipped with intelligence in the meaning of not setting up a flag as a difference. Usually, the difference of the configuration item which has always changed is disregarded.

[0026] The trace tree 412 is the extensible index of the configuration item currently pursued about each of the equipment for surveillance, and is built from the data in a database 214. If the time of a user logging in to a tracking system and using the trace tree 412 comes, the construction will be performed quickly. If a user chooses the data item which looked at the trace tree 412 and was changed, the revision control system 216 will supply the data about change generated in the data item, and will display such change on the data display frame 404. The trace tree 412 uses the data hierarchy of drawing 3 in order to display configuration information. Since the information about each configuration item called a group, equipment, and data item is seen, a user can click the [+] sign, can extend a tree and can choose the name of an object item.

[0027] The change indicator 420 is placed each icon top in the tree chain which falls to the item node level which began from the group node and change generated as a method of showing in a user that change occurred in the configuration item, or next to it. The mark of what kind or what color is sufficient as the change indicator 420. In the desirable operation gestalt of this invention, the blue change indicator 420 expresses change, the yellow change indicator 420 expresses collection failure, and the brown

change indicator 420 expresses the collection execution improper state of a configuration item. Change occurs in composition as a result of comparison of two selected collection periods, and when a trace tree frame is displayed and only a group node is displayed, the change indicator 420 is located the group node icon top or next to it.

[0028] By clicking the [+] sign about a group node icon, a tree is extended and all the equipments under the group node are listed. The equipment which change generated has the change indicator 420 placed on the equipment icon or its following icon. By clicking the [-] sign about the equipment, a tree is extended and all the subsystems under the equipment node are listed. The subsystem which change generated has the change indicator 420 placed on a subsystem icon or its following icon. By clicking the [+] sign about the subsystem, a tree is extended and all the data items under the subsystem node are listed. The data item which change generated has the change indicator 420 placed on the icon of the data item, or its following icon.

[0029] By choosing the device name in the trace tree 412, the name of the data collection template assigned to equipment is displayed. The information about an item is displayed by choosing each configuration item name. The pop up menu which offers access to suitable action is shown by clicking correctly the name in the trace tree 412, an icon, or a sign. The information about the selected item is displayed by choosing the property option of a pop up menu. The time frame 414 displays the date of two selected collection periods about displayed change. The change 416 in a time frame displays change of the data item between two collection periods shown in the time frame 414. The collection history 418 displays the date and time which had change in the object data item.

[0030] Drawing 5 is the flow chart showing the process which displays the configuration information memorized by the remote support node on the browser computer with web browser software. If drawing 5 is referred to, in block 500, web browser software will be called to the browser computer 110 (drawing 1). In block 502, a user demands URL of the tracking system of this invention. Web browser software establishes connection with the remote support node 102 (drawing 1) via the network connection path 104 (drawing 1). In block 506, the remote support node 102 finds out the HTML page demanded in the block 502, and returns it to the browser computer 110 via the network connection path 104.

[0031] The HTML page received with block 506 is displayed on the screen display 400 (drawing 4) on the browser computer 110 (block 508). A screen display is divided into the trace tree frame 402 and the data display frame 404 as shown in drawing 4 . The trace tree frame 402 contains the applet which is the program written with the programming language supported by the web browser. Some [relevant to a HTML page] applets start operation automatically, when a HTML page is received, and they control the display of the trace tree frame 402 within the limits.

[0032] In block 510, a user can choose the reception of much more many data by clicking either of some hyperlinks displayed on the screen display 400. Furthermore, although it is an applet in fact, much more many data are also receivable by clicking the button, the specific tab, and specific data item name which operate like a hyperlink on the trace tree frame 402. (Drawing 4) The tab 406 in the trace tree frame 402, the action button 410 which can be used, and data item name selection are the examples of such an applet. ** [a click of one of the items controlled by these hyperlinks or applets / put / the item which required URL relevant to the hyperlink or was controlled by the applet / in block 512 / the browser computer 110 / into operation] Typically, the item controlled by the applet is the demand to a CGI script.

[0033] The CGI script which the demand to URL or a CGI script was sent via the network connection path 104, it was received by the remote support node 102 in the block 514, and the demand to a HTML page was received there, or was demanded is loaded. In block 516, when a CGI script is required, in order for the remote support node 102 to find out a HTML page, or to obtain execution permission, it communicates with the hat demon software 230. If permission is unnecessary if permission is given or, a CGI script will be performed and will take out data from the data-storage mechanism (drawing 2) 218. In block 518, the data which the HTML page was returned or were taken out from the data-storage mechanism 218 are changed into HTML form, and are returned to the browser computer 110 via the network connection path 104 for a display on the screen display 400.

[0034] In block 520, the HTML page from demanded URL or a CGI script is displayed on the data display frame 404, and the data demanded by the user are displayed. The CGI script performed depending on the case may not return the data for the display in the data display frame 404. Instead, a certain message is sent to the trace tree frame 402.

[0035] Furthermore, when a user should demand the item controlled by many hyperlinks or applets, control can return from block 522 to block 510, and a user can click the item controlled by a following hyperlink or a following applet. In block 522, when data are not required further, a program is ended and the display of the present HTML page is continued. Next a user can choose the URL address unrelated to a tracking system, or can close web browser software, and can load other programs.

[0036] Drawing 6 is the flow chart showing operation of the remote support node which collects composition data from a computer and interconnection equipment. If drawing 6 is referred to, in block 600, the schedule software (drawing 2) 234 will start at the time set beforehand. Usually, a user sets up warm-up time so that network activity like midnight or early morning may start once per day at the time expected to be a low. However, a user can also make the arbitrary time when the collection by which the schedule was carried out has not already advanced put collection into operation. If a schedule will be carried out beforehand and I will start by the user, it is also possible to limit the range of collection to not the whole enterprise but a specific group or equipment.

[0037] In block 602, the schedule software 234 starts a part of pebbles software (drawing 2) 228, and passes it a collection root identifier. A collection root identifier is received and the portion of the pebbles software 228 started by the schedule software 234 is called collection routine. A collection root identifier determines the range of the collection which should be performed.

[0038] In block 604, a collection routine requires the list of items which access the data-storage mechanism (drawing 2) 218, and are in the range of the passed collection root identifier and which should be collected. A list contains GUID (abbreviated name of Globally Unique Identifiers), or the thing only called identifier. Each identifier in a list is related with the unique

configuration item which should be collected from the various equipments for surveillance in the range of a collection root identifier. With a tracking system, each configuration item is the unit of the data collected and supervised, and gives the correspondence relation between a configuration item name and an identifier. This data can also be a command output which displays configuration information in a text file or ASCII form. With composition data itself, a collection routine can also collect the attributes of data useful for a user specified by the data collection template again. It does not have the attribute to which all composition data are helpful, and all composition data items do not have an attribute relevant to them. The collected attribute is displayed on a user.

[0039] The unit of being collected from equipment for surveillance composition data is called snapshot. The difference will be memorized by the remote support node 102 on the data-storage mechanism 218 if the snapshot is changing from the version collected from the snapshot before. The set of all the snapshots of the configuration item collected and memorized is called memorizable composition to the data-storage mechanism 218.

[0040] After a collection routine receives the list of identifiers in block 604, in block 606, a collection routine accesses the data-storage mechanism 218, and collects the collection method information from the data-storage mechanism 218 about each of the identifier of a list. The indicator in which collection information should be used in order that specific data items may be collected from what equipment or what command may collect specific data items, or collection of the last of a specific data item is shown is information, such as something. An indicator is the date by which the known of the checksum of a former output or the last was corrected. Let the value of the indicator about a data item be nothing in advance of the first collection.

[0041] In block 608, a collection routine classifies the information collected in the block 606 according to equipment. Next, block 610 judges whether the first equipment in a list is a computer for surveillance, or it is interconnection equipment. If the first equipment is interconnection equipment for surveillance, control will progress to block 612 and the data collection process about the interconnection equipment for surveillance shown in drawing 7 and drawing 8 will be called. If the first equipment is a computer for surveillance, control will progress to block 614 and the data collection process about the computer for surveillance shown in drawing 9 and drawing 10 will be called.

[0042] Immediately after returning from either of the processes of the process of drawing 7 and drawing 8 or drawing 9, and drawing 10, block 616 judges whether the collection process about still more nearly another equipment should be performed. If there is equipment which should be collected further, it will judge whether the equipment of a degree which returns to block 610 and is in a list is a computer for surveillance, or control is interconnection equipment. If the equipment which should be collected in block 616 is judged that there is more than this [no], it will move from control to block 618, the collection table in the remote support node 102 will be updated, and a process will be ended there. Information -- whether as compared with the time of collection, the range of collection, and pre-collection, this collection had change, or the obstacle occurred -- is included in the information about the collection memorized by the collection table.

[0043] Drawing 7 and drawing 8 show the process which collects composition data from the interconnection equipment for surveillance. If drawing 7 and drawing 8 are referred to, in block 700, a collection routine will call the collection script of the remote support node 102 relevant to the type of the beginning of the interconnection equipment 106 (drawing 1) for surveillance within the limits. In block 702, the collection script calls the first collection command.

[0044] Block 704 judges whether the execution of a command which collects configuration items was successful. Probably, either of the limits of the time limit imposed on execution of a command or the number of times of trial or both restrictions exist. When the execution of a command which collects configuration items is not successful, in block 706, a time stamp is set up and an error message is generated. Block 708 returns a time stamp and an error message to the remote support node 102. The data which memorize the time stamp and error message to the log file which block 710 has in the database 214 of the data-storage mechanism (drawing 2) 218 within the limits are memorized in ASCII form. It moves from control to block 728.

[0045] If it is judged that execution of a collection command succeeded in the block 704, in block 712, a new indicator will be created and a time stamp will be set up. Next, block 714 catches the attribute relevant to the composition data which should be command-outputted and should be collected, a new indicator, and a time stamp. Block 716 is returned to the remote support node 102 in order to memorize these caught data in memory 222. Block 718 compares the new indicator set up in the block 712 with the indicator collected about the configuration item concerned before. It judges whether block 720 has two the same indicators compared in the block 718, or it is different. If two indicators are the same, in block 722, a command output, an attribute, a new indicator, and a time stamp will be canceled, and control will progress to block 728.

[0046] If it is judged that two indicators are different in block 720, in block 724, the difference in a command output, an attribute, a new indicator, and a time stamp will be memorized by the revision control system 216 of the data-storage mechanism (drawing 2) 218 within the limits. Next, block 726 memorizes a new indicator, a time stamp, and a change event indicator in the database 214 of the data-storage mechanism 218 within the limits. All the data are memorized in ASCII form. Next, it moves from control to block 728. It judges whether there is any collection command which should be executed in the group about this interconnection equipment 106 for surveillance further. If there is still a command which should be executed, it will move from control to block 702, and the following command will be called. If the collection command which should be executed in block 728 is judged that there is more than this [no], control will return to the process of drawing 6.

[0047] Drawing 9 and drawing 10 show the process which collects composition data from the computer for surveillance. If drawing 9 and drawing 10 are referred to, a collection routine will start remote execution of a collection process through the RPC (Remote Procedure Call) procedure of DCE (data communication exchange) by passing the information group about the first computer for surveillance to the first computer for surveillance. In block 802, a collection routine calls the client collection software introduced before relating with the computer 108 for surveillance. In block 804, client collection software starts the first

passed collection command.

[0048] Block 806 judges whether the execution of a command which collects configuration items was successful. Probably, either of the limits of the time limit imposed on execution of a command or the number of times of trial or both restrictions exist. When the execution of a command which collects configuration items is not successful, in block 808, a time stamp is set up, an error message is generated and they are memorized by the memory in the computer for surveillance (drawing 1). Data are memorized in ASCII form. Next, it moves from control to block 818.

[0049] When the execution of a command which collects configuration items is successful, in block 810, client collection software creates the new indicator about the configuration item concerned, and compares it with the indicator collected before passing this new indicator in block 800. It judges whether block 812 has two the same indicators compared in the block 810, or it is different. If two indicators are the same, in block 814, a command output, an attribute, a new indicator, and a time stamp will be canceled, and control will progress to block 818.

[0050] If it is judged that two indicators are different in block 812, in block 816, the difference, the attribute, the new indicator, and time stamp of a command output will be memorized by the memory of the computer for surveillance within the limits. Next, it moves from control to block 818. It judges whether block 818 has further the collection command which should be executed in the group about this computer 108 for surveillance. If there is still a command which should be executed, it will move from control to block 804, and client collection software will start the following command. If it is judged that the collection command which should be executed in block 818 does not have more than this, it will move from control to block 820.

[0051] In block 820, the data memorized in the block 808 and the block 816 are returned to the remote support node 102 (drawing 1). In block 822, the time stamp about each of the difference in the output of a command, an attribute, and a collection command with a difference is memorized by the revision control system 216 of the data-storage mechanism (drawing 2) 218 within the limits. Next, block 824 memorizes the new indicator about each, time stamp, and change event indicator of the collection command which has a difference in the database 214 of the data-storage mechanism 218 within the limits. Block 826 memorizes the time stamp and error message about each of the collection command which failed in the log file in the database 214 of the data-storage mechanism 218 within the limits. All the data are memorized in ASCII form. Next, control returns to the process of drawing 6 .

[0052] The point that a time stamp and an error message can be immediately sent to the remote support node 102 because of storage will be understood by this contractor, when a command goes wrong. Since the data which should be memorized are storage when similarly a command is successful and a new indicator and a former indicator have a difference, it can also be immediately sent to the remote support node 102.

[0053] As mentioned above, although this invention was described with reference to the desirable operation gestalt, the point which can add various change and corrections to the above-mentioned operation gestalt will be understood by this contractor, without deviating from the idea of this invention.

[0054] The following operation aspects are included in this invention as an example.

[0055] (1) It is the method of pursuing the composition change in the interior of computer system. The 1st snapshots of a data item which have a unique identifier from the 1st equipment for surveillance on a computer system network at the 1st time set beforehand are collected. The step which sets up the 1st time stamp which displays the time when the 1st snapshots of the above were collected (a), In the interior of the above-mentioned computer system network, it goes via the 1st network connection path. The step which memorizes the 1st snapshot of the above and the 1st time stamp of the above of the above-mentioned data item in the data-storage mechanism with which the interior of the remote support node connected to the equipment for surveillance of the above 1st is equipped (b), The 2nd snapshots with a unique identifier of the above-mentioned data item are collected. the 2nd time set beforehand -- the above from the equipment for surveillance of the above 1st on the above-mentioned computer system network -- The step which sets up the 2nd time stamp which displays the time when the 2nd snapshots of the above were collected (c), The step in comparison with the 2nd snapshot with which the above-mentioned data item carried out above-mentioned] collection of the 1st snapshot in which the above-mentioned data item carried out [above-mentioned] storage (d), If the 2nd snapshot the above-mentioned data item carried out [the snapshot / above-mentioned] collection has the 1st snapshot and at least one difference in which the above-mentioned data item carried out [above-mentioned] storage, when the above-mentioned step (d) will judge, The step which performs the following step (g) and does not perform the following step (f) when the above-mentioned step (d) will judge, if the following step (f) is performed, and the following step (g) is not performed but there is no difference (e), The step which the difference discriminated in the above-mentioned step (d) reaches altogether, and memorizes the 2nd time stamp of the above in the above-mentioned data-storage mechanism with which the interior of the above-mentioned remote support node is equipped as the newest snapshot of the above-mentioned data item (f), It is considered that the 1st snapshot by which storage is carried out [above-mentioned] is the newest snapshot of the above-mentioned data item. The step which cancels the 2nd snap of the above, and the 2nd time stamp of the above (g), On the graphics display in the above-mentioned remote support node [whether all differences by which the storage of / between the 2nd snapshot of the above and the 1st snapshot of the above / was carried out / above-mentioned / are displayed, and] Or the step which displays the indicator that it was judged that there was no difference between the 2nd snapshot of the above and the 1st snapshot of the above (h), The further following snapshots of the above-mentioned data item with a unique identifier are collected. the further next time set beforehand -- the above from the equipment for surveillance of the above 1st on the above-mentioned computer system network -- The step which displays the time when the above and also the following snapshots were collected and which sets up the following time stamp further (i), The step in comparison with the newest snapshot with which the storage of the above-mentioned data item was carried out [above-mentioned] in the above of the above-mentioned data item, and also the

following snapshot (j). It is related with the above and also another snapshot, and the newest snapshot by which storage was carried out [above-mentioned]. In the step (k) which repeats the above-mentioned step (e), (f), (g), and (h), and two or more still more nearly another time beforehand set to the equipment for surveillance of the above 1st on the above-mentioned computer system network the above -- the composition change trace method which contains the step (l) which repeats the above-mentioned step (i), (j), and (k) about two or more still more nearly another snapshots of the above-mentioned data item which has a unique identifier

[0056] (2) When it has the unique identifier from which each of two or more above-mentioned data items differs, it is related with each of two or more still more nearly another equipments for surveillance on the above-mentioned computer system network. The step which repeats the above-mentioned step (a) or a step (l) (m). The composition change trace method given in the above (1) which contains further the step (n) which repeats the above-mentioned step (a) or a step (m) about each of two or more still more nearly another above-mentioned equipments for surveillance on the above-mentioned computer system network.

[0057] (3) Before performing this step (a), the above-mentioned step (a) The step (a0) which sets up the time when the above 1st for collecting the 1st snapshots of the above of the above-mentioned data item in the interior of the schedule software arranged inside the above-mentioned remote support node was defined beforehand is performed. the above-mentioned step (c) Before performing this step (c) The step (c0) which sets up the time when the above 2nd for collecting the 2nd snapshots of the above of the above-mentioned data item in the interior of the above-mentioned schedule software arranged inside the above-mentioned remote support node was defined beforehand is performed. the above-mentioned step (i) Before performing this step (i) The step (i0) which sets up the above for collecting the above and also another snapshots of the above-mentioned data item in the interior of the above-mentioned schedule software arranged inside the above-mentioned remote support node and also another time set beforehand is performed. the above-mentioned step (l) Before performing this step (l) Perform the step (l0) which sets up two or more still more nearly another above-mentioned time for collecting two or more still more nearly another above-mentioned snapshots of the above-mentioned data item in the interior of the above-mentioned schedule software arranged inside the above-mentioned remote support node set beforehand. The composition change trace method given in the above (1).

[0058] (4) The step to which the above-mentioned step (a0) starts the above-mentioned schedule software at the time when the above 1st was defined beforehand (a0a), The step which passes the collection root identifier which defines the list of data items to the pebbles software arranged inside the above-mentioned remote support node from the above-mentioned schedule software (a0b), The step which starts the collection routine portion of the above-mentioned pebbles software using the above-mentioned schedule software (a0c), The step which accesses the data-storage mechanism inside the above-mentioned remote support node using the above-mentioned collection root identifier using the above-mentioned collection routine portion of the above-mentioned pebbles software in order to acquire the above-mentioned data item list (a0d), The result of access to the data-storage mechanism inside the above-mentioned remote support node, It is the collection method information for collecting each above-mentioned snapshots of the above-mentioned data item in the above-mentioned data item list from the equipment for surveillance and two or more still more nearly another equipments for surveillance of the above 1st. The command which collects the attributes relevant to each of the above-mentioned data item in the above-mentioned list, The indicator with which each newest of the above-mentioned data item in the above-mentioned list was memorized, And the step which collects the collection method information including the information from which each of the above-mentioned data item in the above-mentioned list shall be collected between the above 1st and two or more still more nearly another equipments for surveillance (a0e), the composition change trace method given in the above (3) which contains further the step (a0f) into which the above-mentioned collection method information collected in the above-mentioned step (a0e) is classified for every each of the equipment for surveillance of the above 1st, and two or more still more nearly another above-mentioned equipments for surveillance

[0059] (5) The composition change trace method given in the above (4) whose equipment for surveillance of the above 1st on the above-mentioned computer system network is the 1st interconnection equipment for surveillance.

[0060] (6) The above-mentioned step (a) lets the above-mentioned collection routine portion of the above-mentioned pebbles software pass. The step which starts the collection script for collecting the 1st snapshots of the above-mentioned data item from the interconnection equipment for surveillance of the above 1st (a1), It lets the above-mentioned collection script pass about the interconnection equipment for surveillance of the above 1st. The 1st command is started from the above-mentioned collection method information which was collected in the above-mentioned step (a0e), and was classified in the above-mentioned step (a0f). The step which collects the 1st snapshots of the above of the above-mentioned data item from the interconnection equipment for surveillance of the above 1st (a2), The step which judges whether the execution of the 1st command of the above which collects the 1st snapshots of the above of the above-mentioned data item was successful (a3), When the above-mentioned step (a3) judges that execution of the 1st command of the above was successful, perform the following step (a5) or a step (a9), and the following step (a10) or a step (a12) is not performed. The step which performs the following step (a10) or a step (a12), and does not perform the following step (a5) or a step (a9) when the above-mentioned step (a3) judges that execution of the 1st command of the above was not successful (a4), The step which creates the 1st indicator about the above-mentioned data item (a5), The step which catches the 1st output of the 1st command by which execution was carried out [above-mentioned], the 1st attribute, the 1st indicator, and the 1st time stamp (a6), The step which returns them to the above-mentioned remote support node in order to memorize the 1st output of the above which carried out [above-mentioned] prehension, the 1st attribute, the 1st indicator, and the 1st time stamp in the memory inside the above-mentioned remote support node (a7), The 1st output of the above which forms the 1st snapshot of the above and which carried out [above-mentioned] storage, The 1st attribute, the 1st indicator, and the 1st time stamp from the memory inside the above-mentioned remote support node The step transmitted for the storage in the revision control system of the above-mentioned data-storage mechanism arranged inside the above-mentioned remote support node (a8),

The 1st indicator which carried out [above-mentioned] storage, the 1st time stamp which carried out [above-mentioned] storage, and the 1st change event indicator The step transmitted from the memory inside the above-mentioned remote support node for the storage in the database of the above-mentioned data-storage mechanism arranged inside the above-mentioned remote support node (a9), The step which generates the 1st error message and catches this 1st error message and the 1st time stamp of the above (a10), The step which returns the 1st error message and 1st time stamp of the above which carried out above-mentioned] prehension to the above-mentioned remote support node (a11), The step which memorizes the 1st error message and 1st time stamp of the above which carried out [above-mentioned] prehension to the log file in the database of the above-mentioned data-storage mechanism arranged inside the above-mentioned remote support node (a12), ** and also an implication, and the above-mentioned step (c) let the above-mentioned collection routine portion of the above-mentioned pebbles software pass. The step which starts the above-mentioned collection script for collecting the 2nd snapshots of the above-mentioned data item from the interconnection equipment for surveillance of the above 1st (c1), It lets the above-mentioned collection script pass about the interconnection equipment for surveillance of the above 1st. The 1st command is started from the above-mentioned collection method information which was collected in the above-mentioned step (a0e), and was classified in the above-mentioned step (a0f). The step which collects the 2nd snapshots of the above of the above-mentioned data item from the interconnection equipment for surveillance of the above 1st (c2), The step which judges whether the execution of the 1st command of the above which collects the 2nd snapshots of the above of the above-mentioned data item was successful (c3), When the above-mentioned step (c3) judges that execution of the 1st command of the above was successful, perform the following step (c5) or a step (c12), and the following step (c13) or a step (c15) is not performed. The step which performs the following step (c13) or a step (c15), and does not perform the following step (c5) or a step (c12) when the above-mentioned step (c3) judges that execution of the 1st command of the above was not successful (c4), The step which creates the 2nd indicator about the above-mentioned data item (c5), The step which catches the 2nd output, 2nd attribute, 2nd indicator of the above, and 2nd time stamp of the above of the 1st command by which execution was carried out [above-mentioned] (c6), The step which returns them to the above-mentioned remote support node in order to memorize the 2nd output of the above which carried out above-mentioned] prehension, the 2nd attribute, the 2nd indicator, and the 2nd time stamp in the memory inside the above-mentioned remote support node (c7), The step in comparison with the newest indicator which memorized the 2nd indicator of the above of the above-mentioned data item in the above-mentioned step (a0e) in the interior of the above-mentioned remote support node (c8), When judging that the above-mentioned step (c8) differs from the newest indicator with which the storage of the 2nd indicator of the above of the above-mentioned data item was carried out [above-mentioned], perform the following step (c10) and a step (c11), and the following step (c12) is not performed. The step which performs the following step (c12) and does not perform the following step (c10) and a step (c11) when judging that the above-mentioned step (c8) does not differ from the newest indicator with which the storage of the 2nd indicator of the above of the above-mentioned data item was carried out above-mentioned] (c9), The 2nd output of the above which forms the 2nd snapshot of the above and which carried out above-mentioned] storage, The 2nd attribute, the 2nd indicator, and the 2nd time stamp from the above-mentioned memory inside the above-mentioned remote support node It is ***** about the step (c10) transmitted for the storage in the revision control system of the above-mentioned data-storage mechanism arranged inside the above-mentioned remote support node, the 2nd indicator which carried out [above-mentioned] storage and the 2nd time stamp which carried out [above-mentioned] storage, and the 2nd change event indicator. The step transmitted from the above-mentioned memory inside a ** support node for the storage in the database of the above-mentioned data-storage mechanism arranged inside the above-mentioned remote support node (c11), The step which cancels the 2nd output of the above which carried out [above-mentioned] prehension, the 2nd attribute, the 2nd indicator, and the 2nd time stamp (c12), The step which generates the 2nd error message and catches this 2nd error message and the 2nd time stamp of the above (c13), The step which returns the 2nd error message and 2nd time stamp of the above which carried out [above-mentioned] prehension to the above-mentioned remote support node (c14), The step which memorizes the 2nd error message and 2nd time stamp of the above which carried out [above-mentioned] prehension to the log file in the database of the above-mentioned data-storage mechanism arranged inside the above-mentioned remote support node (c15), ** and also the composition change trace method given in the above (5) to include.

[0061] (7) The composition change trace method given in the above (4) whose equipment for surveillance of the above 1st on the above-mentioned computer system network is the 1st computer for surveillance.

[0062] (8) The above-mentioned step (a) by letting the above-mentioned collection routine portion of the above-mentioned pebbles software pass, and passing the collection method information about the computer for surveillance of the above 1st by which the classification was carried out [above-mentioned] to the computer for surveillance of the above 1st The step which starts the remote execution which collects the collection method information about the computer for surveillance of the above 1st by which the classification was carried out [above-mentioned] (a1), Let the above-mentioned collection routine portion of the above-mentioned pebbles software pass, and the client collection software introduced on the computer for surveillance of the above 1st is started. The step which collects the 1st snapshots of the above of the above-mentioned data item (a2), Let the above-mentioned client collection software pass, and the 1st command is started from the above-mentioned collection method information which was passed in the above-mentioned step (a1) and by which the classification was carried out above-mentioned]. The step which collects the above-mentioned data items from the computer for surveillance of the above 1st (a3), The step which judges whether the execution of the 1st command of the above which collects the above-mentioned data items was successful (a4), When the above-mentioned step (a4) judges that execution of the 1st command of the above was successful, perform the following step (a6) or a step (a10), and the following step (a11) or a step (a13) is not performed. The step which performs the following step (a11) or a step (a13), and does not perform the following step (a6) or a step (a10) when the

above-mentioned step (a4) judges that execution of the 1st command of the above was not successful (a5), The step which creates the 1st indicator about the above-mentioned data item (a6), The step which memorizes the 1st output, 1st attribute, 1st indicator of the above, and 1st time stamp of the above of the 1st command by which execution was carried out [above-mentioned] in the memory of the computer for surveillance of the above 1st (a7), The step returned to the above-mentioned remote support node in order to memorize the 1st output of the 1st command which carried out [above-mentioned] storage, the 1st attribute, the 1st indicator, and the 1st time stamp in the memory inside the above-mentioned remote support node (a8), The 1st output of the above which forms the 1st snapshot of the above and which carried out [above-mentioned] storage, The 1st attribute, the 1st indicator, and the 1st time stamp from the memory inside the above-mentioned remote support node The step transmitted for the storage in the revision control system of the above-mentioned data-storage mechanism arranged inside the above-mentioned remote support node (a9), The 1st indicator which carried out [above-mentioned] storage, the 1st time stamp which carried out [above-mentioned] storage, and the 1st change event indicator The step transmitted from the memory inside the above-mentioned remote support node for the storage in the database of the above-mentioned data-storage mechanism arranged inside the above-mentioned remote support node (a10), The step which generates the 1st error message and memorizes this 1st error message and the 1st time stamp of the above in the memory of the computer for surveillance of the above 1st (a11), The step which returns the 1st error message and 1st time stamp of the above which carried out [above-mentioned] storage to the above-mentioned remote support node (a12), The step which memorizes the 1st error message and 1st time stamp of the above which carried out [above-mentioned] storage to the log file in the database of the above-mentioned data-storage mechanism arranged inside the above-mentioned remote support node (a13), ** and also an implication, and the above-mentioned step (c) let the above-mentioned collection routine portion of the above-mentioned pebbles software pass. By passing the collection method information about the computer for surveillance of the above 1st by which the classification was carried out [above-mentioned] to the computer for surveillance of the above 1st The step which starts the remote execution which collects the collection method information about the computer for surveillance of the above 1st by which the classification was carried out [above-mentioned] (c1), Let the above-mentioned collection routine portion of the above-mentioned pebbles software pass, and the client collection software introduced on the computer for surveillance of the above 1st is started. The step which collects the 2nd snapshots of the above of the above-mentioned data item (c2), Let the above-mentioned client collection software pass, and the 1st command is started from the above-mentioned collection method information which was passed in the above-mentioned step (c1) and by which the classification was carried out [above-mentioned]. The step which collects the above-mentioned data items from the computer for surveillance of the above 1st (c3), The step which judges whether the execution of the 1st command of the above which collects the above-mentioned data items was successful (c4), When the above-mentioned step (c4) judges that execution of the 1st command of the above was successful, perform the following step (c6) or a step (c10), and the following step (c11) is not performed. The step which performs the following step (c11) and does not perform the following step (c6) or a step (c10) when the above-mentioned step (c4) judges that execution of the 1st command of the above was not successful (c5), The step which creates the 2nd indicator about the above-mentioned data item (c6), The step in comparison with the newest indicator which memorized the 2nd indicator of the above of the above-mentioned data item in the above-mentioned step (a0e) (c7), When judging that the above-mentioned step (c7) differs from the newest indicator with which the storage of the 2nd indicator of the above of the above-mentioned data item was carried out [above-mentioned], the following step (c9) is performed, the following step (c10) is not performed, but the above-mentioned step (c7) is the above-mentioned data item. The step which performs the following step (c10) and does not perform the following step (c9) when judging that the 2nd indicator of the above does not differ from the newest indicator by which storage was carried out [above-mentioned] (c8), The step which memorizes the difference of the 2nd output of the above which forms the 2nd snapshot of the above, the 2nd attribute, the 2nd indicator of the above, and the 2nd time stamp of the above in the memory of the above-mentioned computer for surveillance (c9), The step which cancels the 2nd output of the above, the 2nd attribute, the 2nd indicator of the above, and the 2nd time stamp of the above (c10), The step which generates the 2nd error message and memorizes this 2nd error message and the 2nd time stamp of the above in the memory of the above-mentioned computer for surveillance (c11), The 2nd output of the 1st command by which execution was carried out [above-mentioned], the 2nd attribute by which storage was carried out [above-mentioned], The step returned to the above-mentioned remote support node in order to memorize the 2nd indicator and 2nd time stamp of the above by which storage was carried out [above-mentioned] in the memory of the above-mentioned remote support node (c12), The step returned to the above-mentioned remote support node from the memory of the above-mentioned computer for surveillance in order to memorize the 2nd error message and 2nd time stamp of the above which carried out [above-mentioned] storage in the memory of the above-mentioned remote support node (c13), The 2nd output of the above which forms the 2nd snapshot of the above and which carried out [above-mentioned] storage, The 2nd attribute, the 2nd indicator, and the 2nd time stamp from the memory inside the above-mentioned remote support node The step transmitted from the memory of the above-mentioned remote support node for the storage in the revision control system of the above-mentioned data-storage mechanism arranged inside the above-mentioned remote support node (c14), The 1st indicator which carried out [above-mentioned] storage, the 2nd time stamp which carried out [above-mentioned] storage, and the 2nd change event indicator The step transmitted from the memory inside the above-mentioned remote support node for the storage in the database of the above-mentioned data-storage mechanism arranged inside the above-mentioned remote support node (a15), The step transmitted from the memory of the above-mentioned remote support node in order to memorize the 2nd error message and 2nd time stamp of the above which carried out [above-mentioned] storage to the log file of the above-mentioned database of the above-mentioned data-storage mechanism in the interior of the above-mentioned remote support node (c16), ** and also the composition change trace method given in the above (7) to include. [0063] (9) The step at which the above-mentioned step (h) loads web browser software on the browser computer connected to the

remote support node via the 2nd network connection path (h1), The step which requires a universal resources locator, i.e., URL, (h2), The above-mentioned browser computer, the step (h3) which establishes the connection via the network connection path of the above 2nd between the above-mentioned remote support nodes, and inside the above-mentioned remote support node The step which finds out the HTML page relevant to the above URL demanded in the above-mentioned step (h2) (h4), In order to display all the differences memorized in the step (h5) which returns the above-mentioned HTML page above to a browser computer via the above-mentioned connection, and the above-mentioned step (f), The composition change trace method given in the above (1) which contains further the step (h6) which displays the above-mentioned HTML page on the screen display on the above-mentioned browser computer.

[0064] (10) In order that the above-mentioned step (h6) may display on the above-mentioned screen display by using the above-mentioned HTML page as a trace tree frame and a data display frame, Answer a user's click, and one function is chosen, and so that things can be carried out On the above-mentioned trace tree frame, at least one tab at least one action button which can be made to start specific action according to a click of the sub step (h6a1) and user who display -- the above -- with the step (h6a) containing the sub step (h6a2) it is displayed on each interior of one tab that is few The step which receives the click input on the hyperlink in the above-mentioned HTML page's (h6b), The step which requires the above URL about the above-mentioned hyperlink in the above-mentioned HTML page of the above-mentioned remote support node via the above-mentioned web browser software and the above-mentioned connection (h6c), The step which finds out the HTML page about the above-mentioned hyperlink demanded in the above-mentioned step (h6c) inside the above-mentioned remote support node (h6d), The step which returns the above-mentioned HTML page about the above-mentioned hyperlink to the above-mentioned browser computer via the above-mentioned connection (h6e), The composition change trace method given in the above (9) which contains further the step (h6f) which displays the above-mentioned HTML page about the above-mentioned hyperlink on the above-mentioned data display frame in the above-mentioned screen display.

[0065]

[Effect of the Invention] Since it is discriminated according to this invention quickly [what change the computer or interconnection equipment of a system configuration within the limits had in between at the two times], and efficiently and the information is offered through a browser screen, a system administrator can carry out management and problem processing of a system configuration easily.

[Translation done.]

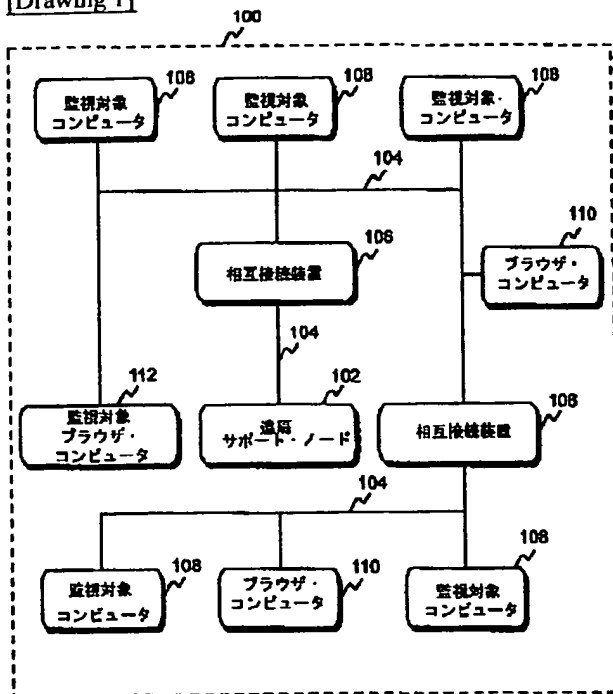
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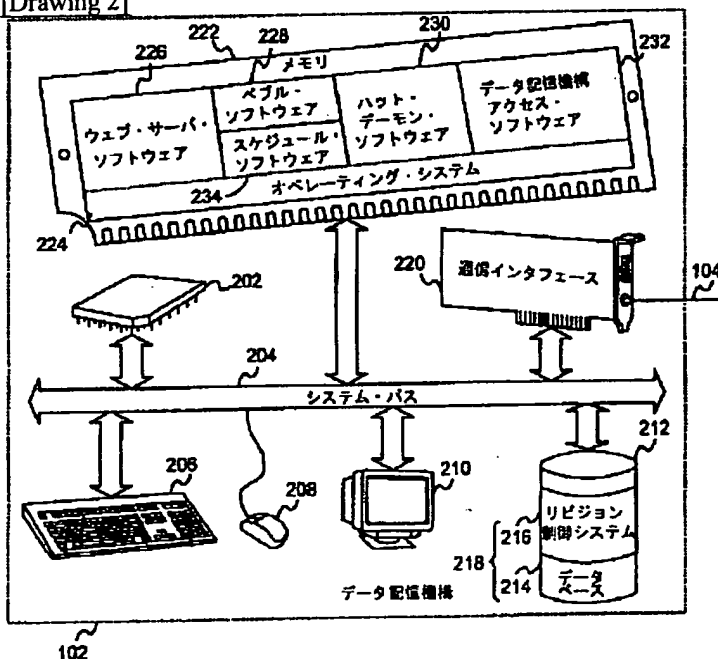
1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

DRAWINGS

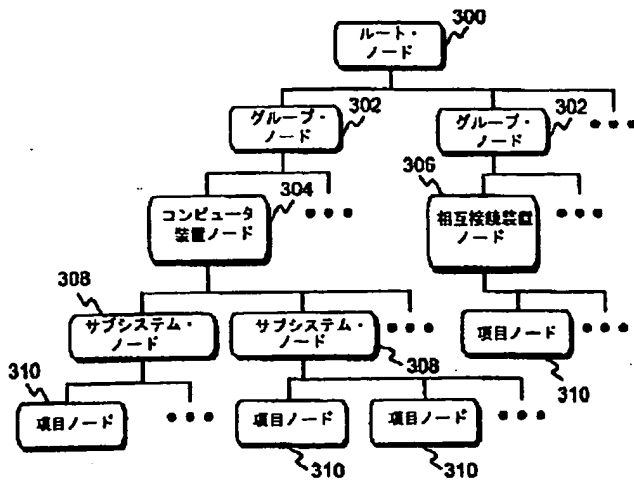
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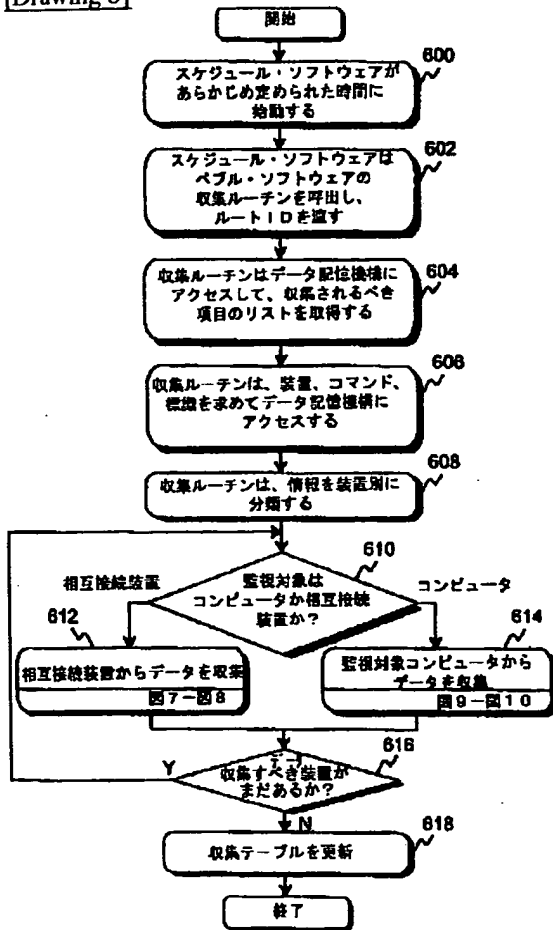
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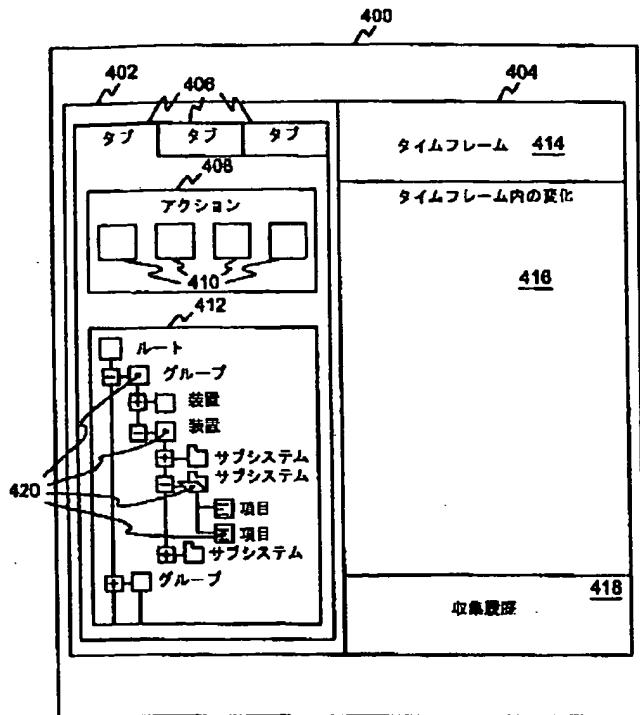
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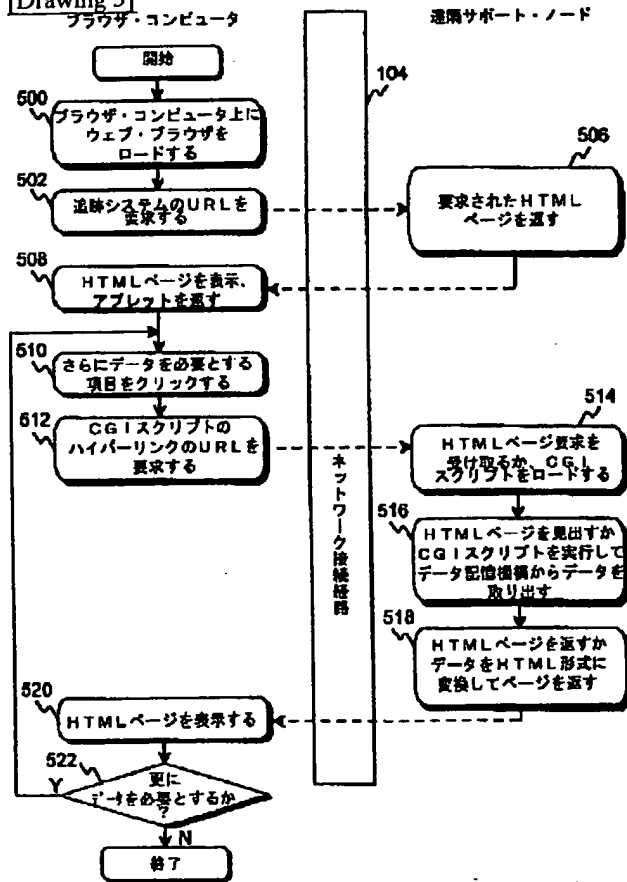
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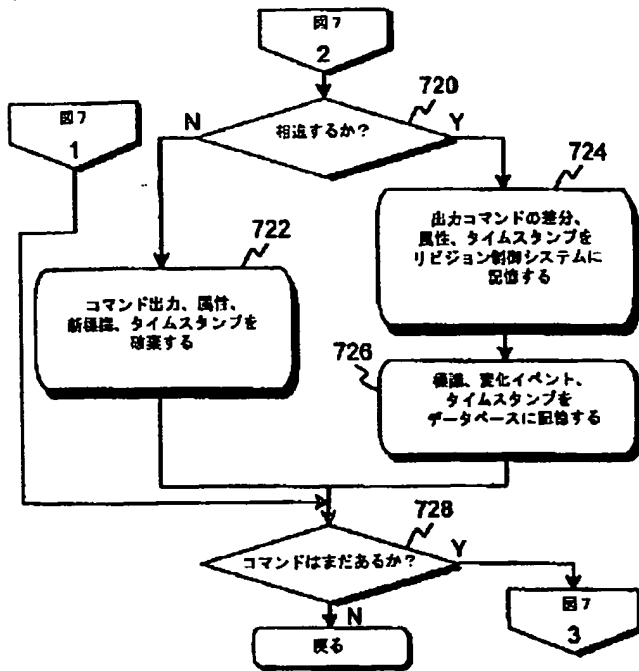
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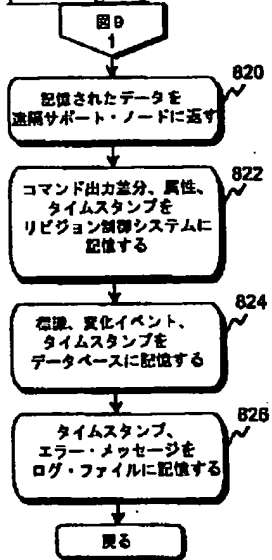
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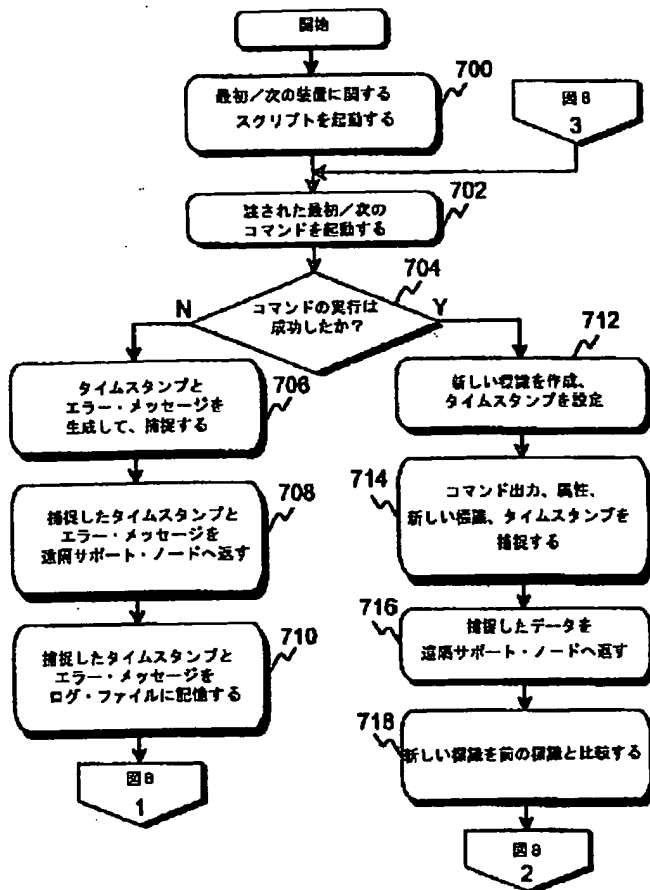
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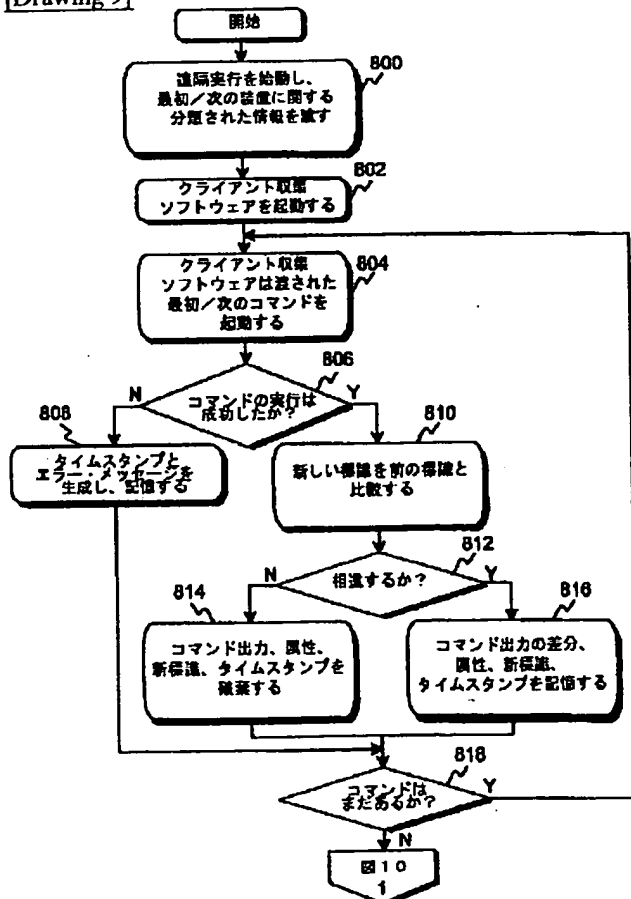
[Drawing 10]



[Drawing 7]



[Drawing 9]



[Translation done.]